L 47304-65
ACCESSION NR: AT5007921

input and output system, experiments on storage, proposed work, experimental set-up, physical layout of magnets, power supply, etc. Orig. art. has: 8 figures.

ASSOCIATION: Institut yadernoy fiziki SO AN SSSR (Institute of Nuclear Physics, SO AN SSSR)

SUBMITTED: 26May64 ENCL: 00 SUB CODE: EE, NP

NO REF SOV: 012 OTHER: 003

mr
Card 5/5

L 4237-66 EWT(m)/EPA(w)-2/EWA(m)-2 IJP(c) GS
ACCESSION NR: AT5007979 S/0000/64/000/000/1065/1072

AUTHOR: Abramyan, Ye. A.; Bender, I. Ye.; Bondarenko, L. N.; Budker, G. I.; Glagolev, G. B.; Kadymov, A. Kh.; Neshkov, I. N.; Naumov, A. A.; Pal'chikov, V. Ye.; Panasyuk, V. S.; Popov, S. G.; Protopopov, I. Ya.; Rodionov, Yu. I.; Samoylov, I. N.; Skrinskiy, A. N.; Yudin, L. I.; Kon'kov, N. G.; Mostovoy, Yu. A.; Nezhevenko, O. A.; Ostreyko, G. N.; Petrov, V. V.; Sokolov, A. A.; Timoshin, I. Ya.

TITLE: Work on the strong-current accelerators of the Nuclear Physics Institute, SO AN SSSR. (I) Strong-current pulse accelerators with spiral storage of the electrons. (II) Strong-current accelerators with one-revolution capture of the injected electrons

SOURCE: International Conference on High Energy Accelerators, Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1065-1072

TOPIC TAGS: high energy accelerator, electron accelerator, electron beam, betatron, plasma

ABSTRACT: The work on developing strong-current electron ring accelerators was begun in 1965 by the authors at the Nuclear Physics Institute, Siberian Department, Academy of Sciences SSSR, with the object of studying the possibility of

Card 1/3

L 4237-66

ACCESSION NR: AT5007979

forming relativistic stabilized beams. In the laboratories of the Institute experimental studies were carried out on the four methods for obtaining large ring currents of relativistic electrons: (1) spiral method of storing the electrons in installations of the betatron type with subsequent betatron synchrotron acceleration (Budker G. I. CERN Symposium 1, 68 (1956); (2) obtaining of limiting electron currents by means of the injection of electrons from a strong-current linear accelerator into a ring chamber of large aperture with subsequent synchrotron acceleration; (3) storage of electrons in tracks (parking orbits) with constant magnetic field by means of the multiple injection of electrons from another less strong-current accelerator; this method is utilized for the storage of electrons and positrons in experiments with colliding beams (expounded in detail by G. I. Budker in the present collection, p. 274); (4) obtaining of large electron currents by means of the acceleration of electrons by a ring plasma. The present report discusses the first two methods under the following topics: (I) pulsed iron-less betatron with preliminary charge storage (B-2 device); strong-current pulsed synchrotron B-2S; pulsed strong-current betatron with spiral storage (B-3 device). (II) iron-less one-turn strong-current synchrotron (BSB); strong-current pulsed synchrotron B-3M. Orig. art. has: 7 figures.

Card 2/3

L 4237-66

ACCESSION NR: AT5007979

ASSOCIATION: Institut yadernoy fiziki SO AN SSSR (Nuclear Physics Institute, SO AN SSSR)

SUBMITTED: 26May65 ENCL: 00 SUB CODE: NP.

NO REF SOV: 001 OTHER: 001

Card 3/3

L 4238-66 EWT(m)/EPA(w)-2/EWA(m)-2 IJP(c) GS

ACCESSION NR: AT5007980 S/0000/64/000/000/1080/1084 44 28 B+1

AUTHOR: Grits, Yu. A.; Iremashvili, D. V.; Naumov, A. A.; Pyatnitskiy, A. P.; Chernov, A. A.; Yudin, L. I.; Yasnov, G. I.; Panasyuk, V. S.; Ostreyko, G. N.

TITLE: Strong-current high-frequency pulse accelerators for one-revolution injection into a synchrotron 19

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1080-1084

TOPIC TAGS: high energy accelerator, synchrotron, electron accelerator

ABSTRACT: Plans were begun in 1959 for the strong-current synchrotron B-3M with external injection of the electrons (Budker, G. I.; Naumov, A. A., et al., present collection, p. 1065). For this there was required an injector of electrons at currents of several tens of amperes and energy not less than 1 Mev. The time duration of the injected bunch of electrons (current pulse) must be sufficient for filling the chamber of the synchrotron, which amounts to about 20 nanoseconds in the case of equilibrium orbit length of 700 cm and relativistic electrons. The deviation from the mean energy of the electrons in a bunch must not exceed ±0.5%. The beam pulse power of the injector amounts to tens of megawatts. In order to obtain

Card 1/4

L 4238-66

ACCESSION NR: AT5007980

such high beam power, the electric field realizes energy that is accumulated over a period of time much larger than the duration of the electron pulse. G. I. Budker and A. A. Naumov have proposed several types of accelerators which are based on this principle, which are being developed in part at the Nuclear Physics Institute, SO AN SSSR. The necessity for the rapid construction of an injector of such a type prompted the utilization of the mentioned principle, in which a radio-engineering resonant circuit serves to store the electric field energy. A similar accelerator was proposed and described by a group of authors (Tolok, V. T.; Bolotin, A. I., et al. *Atomnaya energiya* 11, 41 (1961)). In order to increase the duration of the pulse of accelerated particle current for arbitrary rigid requirements on the homogeneity of the electrons relative to energy, it was required to greatly lower the frequency of the high-frequency voltage in comparison with the case discussed in the last mentioned work (Tolok, V. T., et al.). The development of a 3.5-Mev injector and current around 100 amperes was undertaken at the Physico-technical Institute, Academy of Sciences Georgian SSR, where a group of associates had proposed the design and construction of an injector forming the basis of the present development. Later, because of causes not in the control of the developers, the preparation of the injector began to fall considerably behind that of the accelerator itself. This forced a search for the possibility of producing

Card 2/4

injectors of such type simpler to design and construct with the object of ensuring the initial cycle of work on the construction of an accelerator. In a short time the mentioned Nuclear Physics Institute prepared an injector using a long coaxial line as the resonant circuit. With the help of this injector, work was begun on the investigation of the electron-optical properties of the accelerator and channelizing structure. After about one year this injector was replaced by a more effective one, the so-called small spiral injector, which was made in the mentioned Physicotechnical Institute of the Academy of Sciences Georgian SSR. Still unbuilt is the ultimate injector with electron energy of 3.5 Mev and current around 100 amperes. The work on the injector described in the present report was carried out by A. A. Naumov. It is discussed under the topics: block scheme (self-excited generator of sub-excitation, high-frequency generator, resonant injector circuit, pulse modulator, electron beam modulator, fixation of high-frequency phase, starting accelerator pulses); design and construction; electron guns; radio-engineering devices; measurement of the parameters. In the development of the different components of the injectors mentioned in this report a number of associates took part in the work: at the Nuclear Physics Institute, SO AN SSSR (V. A. Boriaov, I. A. Samokhin, V. G. Gindenko, A. P. Afonin, A. V. Makiyenko, V. P. Alekseyev, L. I. Kol'chenko) and the Physicotechnical Institute, Academy of Sciences Georgian SSR (V. I. Vishnevskiy, Ya. R. Abas-Ogly, V. Ye. Zelenin, M. I. Matrosov.

L 4238-66
ACCESSION NR: AT5007980

Yu. Sh. Venediktov, V. N. Rybin, G. M. Sigidin). Orig. art. has: 3 figures.

ASSOCIATION: Institut yadernoy fiziki SO AN SSSR (Nuclear Physics Institute, SO AN SSSR)

SUBMITTED: 26May64 ENCL: 00 SUB CODE: NP,

NO REF SOV: 003 OTHER: 000

Card 4/4

L 05821-67 EWT(m) IJP(c) OD

ACC NR: AT6031468 SOURCE CODE: UR/0000/65/000/000/0001/0012

AUTHOR: Auslender, V. L.; Blinov, G. A.; Budker, G. I.; Karliner, M. M.; Kiselev, A. V.; Livshits, A. A.; Mishnev, S. I.; Naumov, A. A.; Panasyuk, V. S.; Pestov, Yu. P.; Sidorov, V. A.; Sil'vestrov, G. I.; Skrinskiy, A. N.; Khabakhpashev, A. G.; Shekhtman, I. A.

4,4
B+1

ORG: none

TITLE: Present state of research on the VEPP-2 electron-positron ring 26

SOURCE: AN SSSR. Sibirskoye otdeleniye. Institut yadernoy fiziki. Doklady, 1965. Sostoyaniye rabot na pozitron-elektronnom nakopitele VEPP-2, 1-12

TOPIC TAGS: electron, positron, electron positron storage ring, electron beam /B-3M synchrotron, VEPP-2 electron-positron, steradian

ABSTRACT: The VEPP-2 electron-positron storage ring was designed for experiments on the interaction of positrons and electrons with an energy of up to 2 x 700 Mev. It is basically a special type of B-3M synchrotron, and is equipped with an exterior injector, a high-vacuum storage track, a single thread system to extract the electron beam from the accelerator and insert it into the storage ring.

Card 1/2

L 05821-67

ACC NR: AT6031468

It has electron-optic channels and a converter to transform an electron beam into a positron beam. It now works at an energy of 200 Mev. Basic studies of the process of insertion into the storage ring were made at an energy of 100 Mev. A detailed description is given of the installation and storage of electrons and positrons. A system of spark chambers, comprising a 2 x 0.7 solid angle steradian close to the vertical direction, was prepared for experiments on the interaction of positrons and electrons. Efforts are now being made to increase the accumulation speed of positrons. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 006/ OTH REF: 001/

kh

Card 2/2

L 25793-66 EWT(m) IJP(c)
ACC NR: AP6016377 SOURCE CODE: UP/0089/65/019/006/0502/0505

AUTHOR: Auslender, V. L.; Blinov, G. A.; Budker, G. I.; Karliner, M. M.; Kiselev, A. V.; Livshits, A. A.; Mishnev, S. I.; Naumov, A. A.; Panasyuk, V. S.; Pestov, Yu. N.; Sidorov, V. A.; Sil'vestrov, G. I.; Skrinskiy, A. N.; Khabakhnashev, A. G.; Shekhtman, I. A.

ORG: none

TITLE: Status report on the VEPP-2 positron-electron storage ring

SOURCE: Atomnaya energiya, v. 19, no. 6, 1965, 502-505

TOPIC TAGS: electron positron pair, electron interaction, synchrotron, electron scattering, luminescence, betatron/B-3M synchrotron

ABSTRACT: The VEPP-2 was designed for electron-positron interaction experiments at energies of 2 X 700 Mev. as reported in the "Proceedings of the International Conference on Accelerators", Dubna, 1963. Work accomplished in the two years following that conference includes the following: start-up of the synchrotron injector, accumulation of large electron currents in the storage ring, study of instability related to the interaction of the beam with the resonator, and the accumulation of positrons. At present the VEPP-2 is being used to study the interaction of two beams and to measure the luminescence from the small-angle positron-electron scattering. An over-all schematic diagram of the VEPP-2 is shown, including its connection to a B-3M synchrotron. The latter operates in light-duty mode at 200 Mev, and its 100 ma output pulse is shorter than 20 nsec. Its energy scattering is less than 2% and pulse repetition frequency is about 3 cycles. The storage ring is a weakly focussing racetrack with four identical rectilinear segments 60 cm long. The equilibrium orbit radius is 150 cm and the aperture is

Card 1/2

L 25793-66

ACC NR: AP6016377 O

8 X 14 cm. One segment of the ring is the experimental working section; the opposite section is a resonator; the remaining two are used to inject electrons and positrons. The experiments made and the operation of the equipment are described in detail. It is noted with interest that when betatron oscillations are excited by individual inflector pulses, most of the initial oscillation amplitude decays in a time interval much shorter than the natural radiation decay time. Orig. art. has: 4 figures. [JPRS]

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 006 / OTH REF: 001

Card 2/2 CC

L 40051-65 EWT(m)/EPA(w)-2/EWA(m)-2 Pab-10/Pt-7 IJP(c)

ACCESSION NR: AP5010797 UR/0057/65/035/004/0612/0617

AUTHOR: Abramyan,Ye.A.; Bondar,I.Ye.; Budker,G.I.; Kadyrnov,A.Kh.; Nau[illegible],A.A.; [illegible]

TITLE: A pulsed iron-free synchrotron

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 4, 1965, 612-617

TOPIC TAGS: electron accelerator, synchrotron, betatron, iron free magnet

ABSTRACT: The authors briefly describe the construction and operation of an iron-free synchrotron built in 1956-1957 (and since dismantled) in order to test certain proposals of two of them (G.I.Budker and A.A.Naumov, Dokl. na Mezhdunarodnoy konf. po fizike vysokikh energiy, M., 1956; L'Age Nucleaire, No. 1, 1956). The principal feature of the design was the use of a single-turn shaped conductor magnet under conditions in which the skin depth was small compared with the dimensions of the apparatus. Electrons were injected at 50 keV, were accelerated by betatron action to 2.7 MeV, and were subsequently accelerated with the instrument operating as a synchrotron. The instrument was designed to produce 200 MeV electrons in a magnetic

Card 1/2

L 49251-65

ACCESSION NR: AP5010797

field of 38 kOe. When the experiments were discontinued in 1957 in favor of work with a different model, 70 MeV electrons had been produced. The experience with the accelerator confirmed the principles on which it was based and, in particular, showed that it is possible to produce a magnetic field of given form with great accuracy by means of shaped conductors under conditions of small skin depth. "The following, to whom the authors express their gratitude, participated in various stages of the work: A.M.Stefanovskiy, I.M.Samoylov, L.I.Yudin, V.M.Volosov, B.V. Chirikov, and L.N.Bondarenko." Orig. art. has: 7 figures.

ASSOCIATION: None

SUBMITTED: 06Apr64 ENCL: 00 SUB CODE: NP

NR REF SOV: 004 OTHER: 003

Card 2/2

L 20715-66 EWA(h)/EWT(1)

ACC NR: AP6007825 SOURCE CODE: UR/0120/66/000/001/0136/0139

AUTHOR: Gel'tsel', M. Yu.; Panasyuk, V. S.; Serov, A. F.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR (Institut yadernoy fiziki, SO AN SSSR)

TITLE: Feasibility of operating electronic multipliers as r-f amplifiers 25 34 B

SOURCE: Pribory i tekhnika eksperimenta, no. 1, 1966, 136-139

TOPIC TAGS: photomultiplier, electronic amplifier, rf amplifier

ABSTRACT: An attempt is described of using a photomultiplier for broadband power amplification needed in electron and proton accelerators (ironless proton-synchrotron). Preliminary experiments with standard FEU-12 and FEU-14 multipliers revealed that after 300 hrs of (1-msec) pulse operation, the secondary-emission factor of the multiplier did not change; the amplifier output was 50--70 w. The same photomultipliers were also tested as self-excited oscillators. The above encouraging results permitted constructing a new hot-cathode multiplier by remodeling FEU-12 and providing it with a grid and seven dynodes; the overall transconductance was 0.05 amp/v. The new amplifier developed a pulse of 1 amp at a grid voltage of 1 v (pulse transconductance, 1 amp/v). The above photomultiplier-type amplifier was suggested by A. A. Naumov. "The authors wish to thank B.M. Stepanov for building the experimental model of the hot-cathode multiplier." Orig. art. has: 2 figures. [03]

SUB CODE: 09 / SUBM DATE: 23Jan65 / ORIG REF: 005 / OTH REF: 002/ ATD PRESS: 4223

Card 1/1 UDC: 621.385.15

L 34381-66 EWT(1)

ACC NR: AP6022004 SOURCE CODE: UR/0120/66/000/003/0101/0107

AUTHOR: Gel'tsel', M. Yu.; Panfilov, A. D.; Panasyuk, V. S.; Sobolev, S. S.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR, Novosibirsk (Institut yadernoy fiziki, SO AN SSSR)

TITLE: High-voltage nanosecond pulse generator

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 101-107

TOPIC TAGS: nanosecond pulse, pulse generator, thyratron

ABSTRACT: A high-voltage pulse generator is described which develops 5—50 nsec square pulses of up to 50 kv with rise times from 1 to 5 nsec. The basic circuit consists of a thyratron, anode pulse-forming line, and a cathode output featuring a coaxial line with square-loop ferrite as a nonlinear pulse-forming element. In Fig. 1 is shown one design variant, and in Fig. 2 is shown the ferrite line detail. Another feature of the circuit is the balanced-T form of line termination, which has one arm shorted and the other terminated in a small lumped capacitance, providing a reflection-free pulse output. If the pulse were used, for example, to gate a particle beam passing between plane electrodes, the inherent capacity of the electrodes could act as the required terminating load. Design parameters, including coupling

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L 34381-66

ACC NR: AP6022004

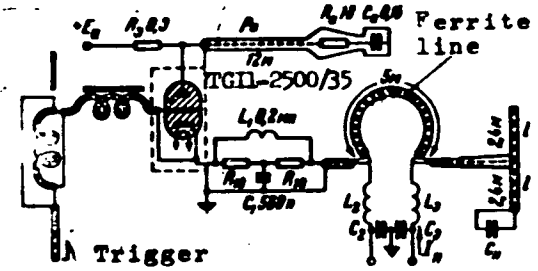

Fig. 1. Nanosecond pulse generator

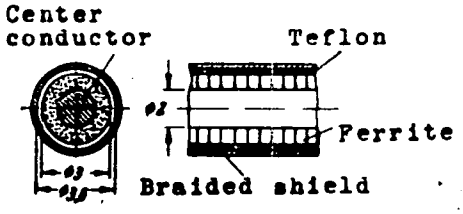

Fig. 2. Nonlinear ferrite line

and matching refinements, are treated at length. Circuit stability is rated good, with a firing-time jitter of not worse than 1 nsec rms. This design has been in use over a year, and has proven unusually reliable. Orig. art. has: 10 figures. [SH]

SUB CODE: 09/ SUBM DATE: 13Apr65/ ORIG REF: 005/ OTH REF: 002
ATD PRESS: 5034

Card 2/2

L 09079-67
ACC NR: AP6021992 SOURCE CODE: UR/0120/66/000/003/0023/0024

AUTHOR: Gel'tsel', M. Yu.; Ostreyko, G. N.; Panasyuk, V. S.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR, Novosibirsk (Institut yadernoy fiziki SO AN SSSR)

TITLE: Modulation of the pulse front of high frequency voltage in a synchrotron resonator

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 23-24

TOPIC TAGS: synchrotron, circuit delay line, RC circuit, accelerator

ABSTRACT: The complexity of a high frequency generator, when a synchrotron generator must deliver large pulse power (up to 1 Mw) relative to its pulse width (~100 μsec), is discussed. A device which can approximate a prescribed calculated curve can be constructed using a linear modulator of energetic pulses for supplying the anodes of a high frequency amplifier, consisting of passive elements. A schematic of such a device and the curve shape for the variation of high frequency voltage obtained with it is presented. The initial voltage U_0 with a front, corresponding to the front of the linear modulator, is formed with the aid of a potentiometer, which consists of load resistance R_H and resistance R. The entrance of the pulse across the delay line into the choke coil and the load is delayed in a time determined by the parameters of this

UDC: 539.1.076

line. The value of the resistance R is chosen to provide the necessary voltage in the resonator at the moment of injection, but it must be sufficiently large in order not to shunt the choke coil. The delay line consists of five T-shaped LC-components. The resistance of the delay line must equal that of the load. A compensation RC-circuit is included in the entrance to the delay line to prevent reflections from returning to the modulator which would result in a malfunction in its operation. Orig. art. has: 3 figures.

SUB CODE: 20/ 09/ SUBM DATE: 26Apr65/ ORIG REF: 002

ACC NR: AP6022003 SOURCE CODE: UR/0120/66/000/003/0098/0101

AUTHOR: Yegorov, A. A.; Samokhin, I. A.; Panasyuk, V. S.; Yudin, L. I.

ORG: Nuclear Physics Institute, SO AN SSSR, Novosibirsk (Institut yadernoy fiziki SO AN SSSR)

TITLE: Synchronization of triggering pulses with a given high frequency voltage phase

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 98-101

TOPIC TAGS: electronic circuit, triggering circuit, particle accelerator

ABSTRACT: A circuit, based on a tube type limiter, is described. It is designed for synchronizing triggering pulses with a given phase of the hf sinusoidal voltage with an accuracy of ~1 nsec when the input voltage is varied from 70 to 200 V and when the line voltage is varied within ± 10%. The circuit consists of a section for fixing the hf voltage phase; a cascade for shaping phased pulses which, after amplification, trigger the output sections; and continuously varible delay lines. By means of special gate pulses the output pulses of the circuit can be coupled to any section of the hf voltage, either pulsed or continuous, at a frequency up to 100 Mc. The circuit can be used in various particle recording systems, in oscillography for the visual observation of individual sections of the hf voltage curve, and it can be incorporated in acceleretor circuits. At present this synchronizing device with five output delay channels is used for triggering control and recording equipment of the

 UDC: 539.1.075

ACC NR: AP6022003

B-3M iron-free electron synchrotron. Orig. art. has: 3 figures.

SUB CODE: 09, 20/ SUBM DATE: 30Apr65/ ORIG REF: 002

Card 2/2

ACC NR: AP6034234 SOURCE CODE: UR/0120/66/000/005/0156/0159

AUTHOR: Yegorov, A. A.; Panasyuk, V. S.; Yudin, L. I.; Ostreyko, G. N.

ORG: Institute of Nuclear Physics, SO AN SSSR, Novosibirsk (Institut yadernoy fiziki SO AN SSSR)

TITLE: Generator of high power pulses with complex shape

SOURCE: Pribory i tekhnika eksperimenta, no. 5, 1966, 156-159

TOPIC TAGS: pulse generator, pulse shaper

ABSTRACT: A multistage generator of pulses with complex shape is described; the shape and amplitude of each segment of the pulse can be regulated. Each stage of the generator has three thyratrons: basic, extinguishing and correcting; each thyratron has its own power supply. Cathodes of basic and regulating thyratrons are connected to the load. The extinguishing thyratron shuts off the basic thyratron; the correcting thratron, together with its associated RLC circuit either adds or subtracts from the current in the basic thyratron and permits the shaping of the output pulse. Outputs of all basic and correcting thyratrons are connected in parallel. Triggering of the basic, the extinguishing and the correcting thyratron controls the duration and amplitude of the output of each stage. In this manner each stage and its triggering control a time segment of the output pulse. The pulse generator is used to generate

Card 1/2 UDC: 621.374

ACC NR: AP6034234 "APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001238920016-9"

excitation currents for ferrite-wound coils. In one instance, for example, a current pulse with the following characteristics was generated: from time t = 90 to t = 250 μsec the current generated by the first stage varied according to the expression $1 - e^{-\alpha t}$; from t = 250 to t = 600 μsec the current was controlled by the second stage and varied exponentially. Orig. art. has: 3 figures.

SUB CODE: 09/14/ SUBM DATE: 06Nov65/ ORIG REF: 001/ OTH REF: 001

Card 2/2

ACC NR: AP7001936 SOURCE CODE: UR/0120/66/000/006/0039/0040

AUTHOR: Grits, Yu. A.; Panasyuk, V. S.; Ostreyko, G. N.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR, Novosibirsk (Institut yadernoy fiziki, SO AN SSSR)

TITLE: High-frequency power stage excitation circuit for feeding cyclic and linear accelerator resonators

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1966, 39-40

TOPIC TAGS: cyclic accelerator, linear accelerator, particle accelerator component

ABSTRACT:
In high-power common-grid pulse amplifiers for cyclic or linear accelerators, low efficiency and pulse distortion result from a mismatch between the driver and the power tubes where the second harmonic is undesirable An excitation circuit is presented in which the fundamental and the second harmonics follow different paths at the power tube cathode input circuit. The interstage circuit between the driver and the power tube consists of a tuned split LC circuit (tuned to the fundamental frequency), two parallel cable sections assuring a high travelling wave ratio for the fundamental and a high impedance for the second harmonic (cable length is such that it acts as a quarter-wave cable for the second harmonic). The second harmonic is further trapped by LC circuits between

UDC: 621.3.084.872:621.384.61;621.384.62

ACC NR: AP7001936

the power tube cathode and ground. The described circuit was tested using a GK-5A power tube operating at 6.3 Mc in pulsed mode. The output pulse had a power of 3 Mw. Its duration and repetition frequency were 1 msec and 12 cps, respectively. It is claimed that the efficiency of this circuit is 60% greater than that of the simple common grid circuit. Orig. art. has: 4 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 02Dec65/ ORIG REF: 002 / ATD PRESS: 5111

Card 2/2

L 05642-67 EWT(m) IJP(c)

ACC NR: AP6021620 (N) SOURCE CODE: UR/0089/66/020/003/0206/0210

AUTHOR: Budker, G. I.; Kiselev, A. V.; Kon'kov, N. G.; Naumov, A. A.; Nifontov, V. I.; Ostreyko, G. N.; Panasyuk, V. S.; Petrov, V. V.; Yudin, L. I.; Yasnov, G. I.

ORG: none

TITLE: Starting of the B-3M synchrotron, used as an injector for a positron-electron storage ring

SOURCE: Atomnaya energiya, v. 20, no. 3, 1966, 206-210

TOPIC TAGS: synchrotron, ~~particle~~ linear accelerator, storage ring, cyclotron magnet/ VEPP-2 storage ring, B-3M synchrotron, ILU linear accelerator

ABSTRACT: The article describes an adjustment of a synchrotron with external single-turn injector and single-turn emission of electrons and with a specially constructed electromagnet. This pulsed synchrotron is designed to serve as an injector for the VEPP-2 storage ring for colliding positron and electron beams, designed and described by one of the authors (G. I. Budker, et al., in Trudy Mezhdunarodnoy konferentsii po uskoritelyam, Dubna, 1963 [Transactions of International Conference on Accelerators, Dubna, 1963], Atomizdat, 1964, p. 1065, and elsewhere). The article describes the synchrotron itself (Fig. 1), the magnet, two variants of capture into synchronism, and various test procedures. The injector for the B-3M synchrotron was an ILU pulsed linear accelerator. The injected electrons had energy 1 - 1.5 Mev (pulse duration ~7 nsec) and were accelerated to 50 Mev. The B-3M synchrotron makes it possible to

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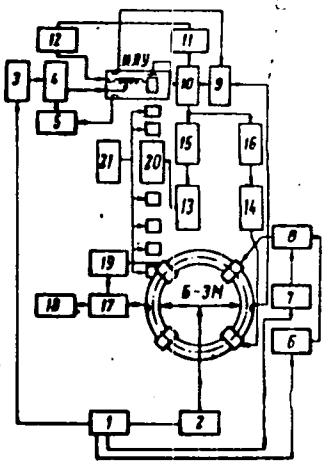
ACC NR: AP6021620

Fig. 1. Block diagram of the apparatus of the B-3M synchrotron. 1 - Starting-pulse block, 2 - electromagnet excitation, 3 - hf generator modulator, 4 - injector hf generator, 5 - phase shifter, 6,7 - modulators, 8 - amplifier, 9 - computer, 10 - phase fixing block, 11 - delay line, 12 - electron gun pulse generator, 13 - electron shutter pulse generator, 14 - inflector pulse generator, 15,16 - delay line, 17 - voltage comparison, 18 - reference voltage, 19 - deflector pulse generator, 20 - electronic shutter, 21 - channel electron supply block.



operate the VEPP-2 storage ring at energies 100 - 130 Mev and an electron current ~100 mA, at an approximate repetition frequency 1 cps. The ILU injector was recently replaced by one with higher injection energy (2.5 - 3 Mev) and longer injection pulse (15 nsec). This increased the number of electrons in the storage ring by approximately a factor of 10. Orig. art. has: 10 figures.

SUB CODE: 20/ SUBM DATE: 22Nov65/ ORIG REF: 006

Card 2/2

L 11426-67 EWT(m)-- IJP(c)
ACC NR: AP6031256 SOURCE CODE: UR/0057/66/036/009/1523/1535

AUTHOR: Budker,G.I.; Medvedev,P.I.; Mostovoy,Yu.A.; Mozhevenko,O.A.; Nolidov,A.B.; Ostreyko,G.N.; Panasyuk,V.S.; Samoylov,I.M.

ORG: none

TITLE: The BSB iron-free single turn synchrotron

SOURCE: Zhurnal tekhnicheskoy fiziki, v.36, no. 9, 1966, 1523-1535

TOPIC TAGS: electron accelerator, synchrotron

ABSTRACT: This paper is concerned with the type BSB iron-free single turn synchrotron developed at the IYaF CO AN SSSR for injection of up to 180 MeV electrons into a storage ring. A general description of the machine has been given elsewhere by Ye.A. Abramyan and 22 other authors (Transactions of the International Conference on Accelerators, Dubna, 1963, p.1065, Atomizdat, M., 1964). In the present paper certain features of the accelerator are described in somewhat more detail, including the magnet, the magnet power supply, and the injector, and the adjustment of the machine is discussed. The magnet winding consists of two concentric duralumin rings between which the beam circulates. The outer ring is capable of withstanding a magnetic pressure of 50 atm, and the geometry is such that the inner ring is in equilibrium under the magnetic forces, being subjected only to a hydrostatic pressure. The magnet is powered by a 0.045 F capacitor bank charged to 10 kV. The maximum magnet current is about

Card 1/2

ACC NR: AT6031256

10^6 A, corresponding to an electron energy of 180 MeV. There are two auxiliary capacitor banks which are discharged at selected phases of the cycle to control the [illegible] of the magnetic field. Injection of 600 kV electrons is accomplished during a single revolution of the captured electrons. The discharge of the auxiliary capacitor banks is so timed that the field is approximately constant during the injection. The rf accelerating voltage is frequency modulated from 105.5 to 116 MHz, and is applied to the beam with the aid of a single resonator with a Q of 200. Some difficulties were encountered in the adjustment of the machine, but none that could not be overcome. It was possible to inject about 1.2 A of 600 kV electrons into the approximately constant field, and to accelerate some 20 % of the injected electrons. The maximum beam current was found to be limited by longitudinal space charge effects (the negative mass effect), rather than by transverse space charge effects. It is suggested that higher currents might be achieved with a strong focusing iron-free [illegible] machine. The authors thank A.A.Naumov for his interest and discussion, V.A. [illegible] for organizing the fabrication of the main parts of the accelerator, and A.I.Kovalenkin, A.A.Lyashin, and P.G.Kharchenkov for participating in the development of certain parts of the accelerator. Orig. art. has: 3 formulas and 6 figures.

SUB CODE: 20/ SUBM DATE: 27Sep65/ ORIG REF: 009/ OTH REF: 001

Card 2/2 Pub

ACC NR: AT7004004 SOURCE CODE: UR/0000/66/000/000/0278/0286

AUTHOR: Gel'tsel', M. Yu.; Panasyuk, V. S.; Panfilov, A. D.; Sobolev, S. S.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR (Institut yadernoy fiziki SO AN SSSR)

TITLE: Nanosecond-pulse generator intended for synchrotron inflector

SOURCE: Mezhvuzovskaya konferentsiya po elektronnym uskoritelyam. 5th, Tomsk, 1964. Elektronnyye uskoriteli (Electron accelerators); trudy konferentsii. Moscow, Atomizdat, 1966, 278-286

TOPIC TAGS: nanosecond pulse, pulse generator, synchrotron

ABSTRACT: The development of a 30-nanosecond-pulse generator is reported; rise time, 5 nsec; pulse height, 50 kv; repetition rate, 50 cps. The generator (see figure) comprises a switching hydrogen thyratron, a 5-m long externally magnetized oil-immersed ferrite line FL, and a T-shaper with one arm short-circuited and another connected to inflector plates C. The ferrite-line stability remains within 1 nsec if the voltage at each point is stabilized within 1%; with an

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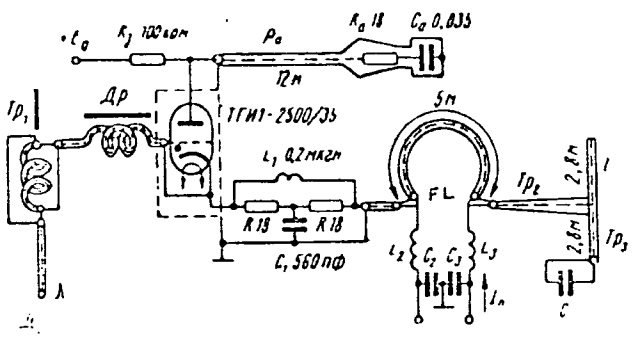
ACC NR: AT7004004



initial magnetization of 0.2 amp/cm or more, the delay is practically independent of magnetization. The T-shaper has no reflected signals, which enhances the efficiency of entrainment of injected particles. Experiments with the above generator have shown that the maximum time variation, between thyratron firing and appearance of voltage at C, is ± 5 nsec for anode voltages within 10—35 kv. Generators built along the above lines have been in operation in the IYaF SO AN SSSR for about one year. "In conclusion, the authors wish to thank A. A. Naumov for organizing this project and I. G. Katayev for his advice." Orig. art. has: 7 figures and 6 formulas.

SUB CODE: 09 / SUBM DATE: 06Mar66 / ORIG REF: 009

Card 2/2

ACC NR: AT7004005 SOURCE CODE: UR/0000/66/000/000/0287/0290

AUTHOR: Grits, Yu. A.; Ostreyko, G. N.; Panasyuk, V. S.; Yudin, L. I.

ORG: Institute of Nuclear Physics, SO AN SSSR (Institut yadernoy fiziki SO AN SSSR); Physico-Technical Institute, GKAE SSSR (Fiziko-tekhnicheskiy institut GKAE SSSR)

TITLE: High-frequency pulse generator with 8-Mw pulses intended for a high-power electron accelerator

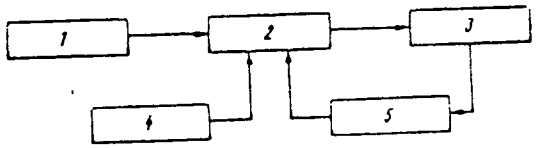
SOURCE: Mezhvuzovskaya konferentsiya po elektronnym uskoritelyam. 5th, Tomsk, 1964. Elektronnyye uskoriteli (Electron accelerators): trudy konferentsii. Moscow, Atomizdat, 1966, 287-290

TOPIC TAGS: pulse generator, electron accelerator

ABSTRACT: A linear accelerator with a 40-amp, 1.3-Mev, ± 0.5%-spread, 7-nsec pulse was developed and built in the Physico-Technical Institute, GKIAE SSSR. It was put into operation in the Institute of Nuclear Physics, SO AN SSSR, and has been used there for a single-circle injection into an electron synchrotron.

Card 1/2

ACC NR: AT7004005



Hf energy stored in a 6.4-Mc resonator is used for particle acceleration. Modulator 1 (see figure) supplies voltage pulses to two-stage generator 2 anodes; feedback is effected via high-Q load 3; adjustable coaxial line 5 is employed for selecting the feedback phase. A low-power oscillator 4 is intended for overcoming the resonator multipactor. A power of 8 Mw was obtained from the generator, with 25-kv anode pulses, during tests. However, in the above high-Q-load-excitation scheme, the generator develops 3.6 Mv at 16 kv. "The authors wish to thank A. A. Naumov for organizing this project, and V. I. Vishnevskiy, N. P. Rubinshteyn, and Ye. P. Mel'nikov for their participation in the alignment of the equipment." Orig. art. has: 2 figures.

SUB CODE: 09 / SUBM DATE: 06Mar66 / ORIG REF: 003

PANASYUK, V.T., glavnyy vrach

Tuberculosis control work of the Tripol'ye rural sector hospital.
Probl. tub. 36 no.8:8-13 '58. (MIRA 12:7)

1. Tripol'skaya sel'skaya uchastkovaya bol'nitsa Kiyevskoy oblasti.
(TRIPOL'YE--TUBERCULOSIS--HOSPITALS AND SANATORIUMS)

PANASYUK, V.T.

Experience with antituberculosis vaccination and revaccination in a rural medical section. Vrach. delo no.1:71-73 '59.
(MIRA 12:4)

1. Uchastkovaya bol'nitsa Obukhovskogo rayona, s. Tripol'ye, Kiyevskoy obl.
(TRIPOL'YE (OBUKHOV DISTRICT)--BCG VACCINATION)

PANASYUK, V.V.

Pressure of a disk exerted on a circular aperture in an elastic plane. Nauch.sap. IMA L'viv.fil. AN URSR no.1:110-120 '53. (MLRA 8:11)
(Elasticity) (Strains and stresses)

PANASYUK, V. V. —

"The Contact Problem for a Circular Aperture."
Cand Phys-Math Sci, Inst of Machine Science and Automatics,
L'vov, 1954. (RZhMekh, Oct 54)

Survey of Scientific and Technical Dissertations Defended at
USSR Higher Educational Institutions (10)

SO: Sum No. 481, 5 May 55

PANASYUK, V.V.

Pressure of a die on the edge of a circular aperture. Dop. AN URSR no.1:37-40 '54. (MLRA 8:4)

1. Institut mashinoznavstva i avtomatiki AN URSR. Predstavleno deystvitel'nym chlenom Akademii nauk USSR G.N Savinym.
(Elasticity)

PANASYUK, V.V.

A contact problem for circular apertures. Nauch. zap. IMA L'viv. fil. AN URSR. Ser.mash.3 no.2:59-79 '54. (MLRA 8:11)
(Elasticity) (Dies (Metal-working))

Panasyuk, V. V.

USSR/Engineering - Mechanics

FD-1109

Card 1/1 Pub. 41-3/13

Author : Leonov, M. Ya. and Panasyuk, V. V., L'vov

Title : Stability of casing tubes

Periodical : Izv. AN SSSR Otd. tekh. nauk 5, 51-56, May 1954

Abstract : Investigates the possible loss of stability of a long tube subjected to uniform pressure by an elastic body. This kind of problem is encountered in the study of the stability of casings and similar underground structures. The problem is solved under conditions of plane deformation of the tube and elastic body, being reduced to a study of the deformation of an infinitely elastic plane with a circular hole whose edge is reinforced by a thin elastic ring. Graphs, table. One reference.

Institution : Institute of Machine Studies and Automatics of the Academy of Sciences of the UkSSR

Submitted : February 15, 1954

KARPENKO,G.V., doktor tekhnicheskikh nauk, professor, redaktor; SAVIN,G.N. redaktor; LOPATINSKIY,Ya.B., redaktor; LEONOV,M.Ya., doktor fiziko-matematicheskikh nauk, redaktor; MIKHYLOVSKIY,V.N., kandidat tekhnicheskikh nauk, redaktor; PARASYUK,O.S., kandidat fiziko-matematicheskikh nauk, redaktor; PANASYUK,V.V., kandidat fiziko-matematicheskikh nauk, redaktor; ZIL'BAN,M.S., redaktor; RAKHLINA,N.P., tekhnicheskiy redaktor

[Some problems in the fatigue of steel with calculation of the influence of active agents]Nekotorye voprosy ustalostnoi prochnosti stali s uchetom vliianiia aktivnoi sredy. Kiev, Izd-vo Akademii nauk USSR, 1955. 48 p. (MLRA 9:3)

1. Akademiya nauk URSR, Kiyev. Institut mashinoznavstva i avtomatiki. 2. Deystvitel'nyy chlen AN USSR (for Savin) 3. Chlen-korrespondent AN USSR (for Lopatinskiy) (Steel--Fatigue)

PANASYUK,V.V.; PODSTRIGACH,Ya.S.; YAREMA,S.Ya.

Thermal stresses in a cylindrical shell. Dop. AN URSR no.3:231-234 '55. (MLRA 8:11)

1. Institut mashinoznavstva ta avtomatiki Akademii nauk URSR. Predstaviv diysniy chlen Akademii nauk URSR G.M.Savin
(Elastic plates and shells)

VULAKH, V.L.; IVANOVA, V.V.; KOS'YANOV, G.I.; PANASYUK, V.V., kandidat fiziko-matematichnikh nauk, redaktor

[Scientific works of Lvov scientists; engineering and applied mechanics. A biobibliography] Naukovi pratsi uchenykh L'vova; tekhnika i prykladna mekhanika. Bio-bibliografichni materialy. L'viv, 1956. 132 p. (MLRA 10:3)

1. Akademiya nauk URSR, Kiyev. L'vivs'ka biblioteka.
(Bibliography--Lvov--Engineers)
(Lvov--Engineers--Bibliography)

SOV/124-57-8-9202

Translation from: Referativnyy zhurnal. Mekhanika 1957 Nr 8 p 104 (USSR)

AUTHORS: Panasyuk, V. V. Podstrigach, Ya S Yarema S Ya

TITLE: Temperature Stresses in the Walls of High-pressure Boiler Shells (Temperaturnyye napryazheniya v stenkakh barabanov kotlo vysokogo davleniya)

PERIODICAL: Nauch zap. In-ta mashinoved. i avtomatiki AN UkrSSR 1956, Vol 5, pp 5-24

ABSTRACT: With periodic shut-downs during the process of operation the shells of high-pressure boilers are subjected to uneven heating which creates temperature stresses in the shell walls The paper presents an account of a theoretical as well as experimental investigation of the thermal stresses in the walls of a free v-supported cylindrical shell under the condition that the temperature varies only along the contour of a cross section in accordance with the law t = t(s) (where s is the arc of the contour) and remains constant along both the generatrix and the wall thickness. The paper provides a numerical example of the calculation for temperature stresses. An account is also given of an experimental investigation with respect to the determination of the

Card 1/2

SOV 124-57-8-1919

Temperature Stresses in the Walls of High Pressure Boiler Shells

temperature field in the wall of a shell and of the determination of the elastic strains. The elastic strains were measured by wire resistance strain gages included in a bridge circuit. The paper compares the calculated results with those of the experimental investigations.

V. I. Danilovskaya

Card 2/2

SOV 124-58 2-2077

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 2, p 82 (USSR)

AUTHORS: Leonov, M. Ya., Panasyuk, V. V.

TITLE: On the Approximate Determination of Torsional Stiffness (O priblizhennom opredelenii zhestkosti pri kruchenii)

PERIODICAL: Nauchn. zap. In-ta mashinoved. i avtomatiki AN UkrSSR, 1956, Vol 5, pp 46-50

ABSTRACT: For the determination of the torsional stiffness of a thin-walled bar the author adduces the approximate formula

$$C = \frac{4}{3} G \oint h^3(s)\,ds \qquad (*)$$

where $h(s)$ is the distance from a given point on the contour to the center line (Leonov, M. Ya., Nauchn. zap. In-ta mashinoved. i avtomatiki AN UkrSSR, 1956, Vol 5, pp 41-45; RZhMekh, 1957, Nr 4, abstract 4596) and the integration extends over the entire contour. The stiffness is computed according to formula (*) for cases in which the cross section is a circular sector and a rectangle. The approximate results obtained are compared with exact results. The paper fails to provide a rigorous assessment

Card 1/2

SOV 124-58-2-2077

On the Approximate Determination of Torsional Stiffness

of the limits of applicability of formula (*).

B. L. Abramyan

Card 2/2

25346

S/021/61/000/007/003/011
D205/D306

24.4200

AUTHORS: Panasyuk, V.V., and Lozovyy, B.L.

TITLE: Determining the magnitude of ultimate stress for a plate with two cracks of equal length

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR, Dopovidi, no. 7, 1961, 876 - 879

TEXT: An infinite plate with two cracks of equal length is considered. Let these cracks be parallel to the axis Ox (Fig. 1) and let tensile stresses $\sigma_y^{\infty} = \sigma_{\infty}$ (= const), perpendicular to the line on which the cracks are situated, act at infinitely far points of the plate. The system chosen is of Cartesian coordinates as shown in Fig. 1 denoting the abscissae of the ends of the cracks by (-b, -a) and (a, b) respectively. The length of each crack is $2\ell = (b - a)$, and the distance between the cracks is 2a. It is supposed that the material of the plate obeys Hooke's law. For such a case the magnitude of the stresses is determined

Card 1/6

Determining the magnitude ...

$$\sigma_k = \min \sigma_\infty , \qquad (1)$$

at which there appears an increase of the length 2ℓ (extension) in both cracks. The stresses are called σ_k critical or ultimate. To determine the stresses σ_k A.A. Griffith's energetical method is used as proposed in this paper (Ref. 1: Theory of Rupture, Proc. First. Congr. Appl. Mechanics, Defft, 1924, p. 55). According to Griffith's theory the stresses σ_∞ will be critical (ultimate), if the condition

$$\frac{\partial}{\partial t} (U - A) = 0 \qquad (2)$$

is fulfilled. U being the surface energy of the expanding crack and A the magnitude of elastic energy released due to expansion of the crack. The magnitude of surface energy of the crack for this problem (Fig. 1) can be written

$$U = 4(b - a)hT = 8\ell hT. \qquad (3)$$

Card 2/6

T being the intensity of the surface energy of the body and h the thickness of the plate. The magnitude (A) of the decrease (release) of the elastic energy of the body is known (Ref. 2: L.C. Leybehzon, Kurs teorii uprugosti, Gostekhizdat, 1947), (Ref. 3: V.V. Panasyuk, Prykladna Mekhanika, 4, 14, 1960) to be equal to the work of the external forces on one half of their generalized displacements. Fig. 2 represents the stresses

$$\sigma_{kp}^{(b)} \text{ and } \sigma_{kp}^{(a)}$$

as functions of the ratio a/ℓ. From these diagrams it follows that the critical (ultimate) stresses σ_k for a plate with two cracks of equal length situated at a distance 2a will be

$$\sigma_k = \begin{cases} \sigma_{kp}^{(a)} & \text{if } \sigma_{kp}^{(a)} > \sigma_k^{(h)} \\ \sigma_k^{(h)} & \text{if } \sigma_{kp}^{(a)} \leqslant \sigma_k^{(h)} \end{cases} . \qquad (17)$$

Determining the magnitude ...

Eq. (17) gives the solution of the problem formulated earlier. The problem can also be solved with the aid of the method of forces as shown in (Ref. 5: G.I. Barenblat, and G.P. Cherepanov, Izv. AN SSSR OTH, Mekh. i mashinostroyeniye, 3, 79, 1960). There are 2 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: A.A. Griffith, Theory of Rupture, Proc. First Congr. Appl. Mechanics Defft (sic) 1, 24, p. 55.

ASSOCIATION: Instytut mashinoznavstva ta avtomatyky AN URSR. Ukrayins'kyy polihrafichnyy instytut (Scientific Institute for Machinery and Automation AS UkrRSR, Ukrainian Polygraphic Institute)

SUBMITTED: February 6, 1961

LEONOV, M.Ya. (L'vov); PANASYUK, V.V. (L'vov)

Formation of slight cracks in a solid body. Prykl. mekh. 5 no.4:391-401 '59. (MIRA 13:3)

1. Institut mashinovedeniya i avtomatiki AN USSR.
(Elastic solids)

29170
S/021/60/000/009/003/009
D210/D303

ID 7600

AUTHOR: Panasyuk, V.V.

TITLE: On the theory of crack spreading during deformation of a brittle body

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR Dopovidi, no. 9. 1960, 1185 - 1189

TEXT: The author considers the development of cracks in a brittle body, when stretching stresses perpendicular to the surface of the crack are present. It is assumed that a plane deformation takes place. It is assumed that the crack has the shape as shown in Fig. 1, with the length $2l_0$, and stretching $\sigma_y = p$ at the infinite points of plane xOy. The ultra-micro-crack will be considered as that part of the body, where deformations between its atoms are bigger than the maximum values of elastic deformation. In the present problem such regions occur near the ends of the crack. The walls of the ultramicro-crack attract each other with the force X

Card 1/5

On the theory of crack ...

$p[2v(x)]$ when the distance $2v(x) < \delta_k$ for $l_0 < |x| < l$ where l is abscissa of the points on the border, between ultra-micro-crack and elastic part of the body. The value of δ_k for a brittle body could be formed from

$$\int_0^{\frac{\delta_k}{2}} p[2v(x)]dv = T. \qquad (2)$$

Therefore, the problem was reduced to the following problem of the theory of elasticity. In the elastic plane xOy is a crack with the length $2l$ $(-l \leq x \leq l)$. On the surface of the crack acts the normal pressure

$$p_n(x) = \begin{cases} p - p[2v(x)] & \text{for } l_0 < |x| \leq l, \\ p & \text{for } -l_0 \leq x \leq l_0. \end{cases} \qquad (3)$$

It was then found that the vertical displacements $v(x)$ were given

Card 2/6

On the theory of crack ...

by $$v(x) = -c\int_{-l}^{l} p_n(\xi)\,\Gamma(l, x, \xi)\,d\xi, \qquad (4)$$

where $$-l < x < l;\quad \Gamma(l, x, \xi) = \ln\frac{l^2 - x\xi - \sqrt{(l^2 - x^2)(l^2 - \xi^2)}}{l^2 - x\xi + \sqrt{(l^2 - x^2)(l^2 - \xi^2)}};$$

$c = \frac{1 - \nu^2}{\pi E}$, E is a Young modulus, and ν - Poisson's coefficient, while the stresses $\delta_y(x, 0)$ are given by

$$\sigma_y(x, 0) = \frac{1}{\pi\sqrt{x^2 - l^2}}\int_{-l}^{l} \frac{p_n(\xi)\sqrt{l^2 - \xi^2}}{x - \xi}\,d\xi \quad (x > l). \qquad (5)$$

They must never be greater than (δ_{theor}) i.e. bounded or for $x = l$,

$$\lim_{x \to l} \int_{-l}^{l} \frac{p_n(\xi)\sqrt{l^2 - \xi^2}}{x - \xi}\,d\xi = 0. \qquad (6)$$

Card 3/6

On the theory of crack ...

By differentiating Eq. (4),

$$v'(x) = \frac{-2c}{\sqrt{l^2 - x^2}} \int_{-l}^{l} \frac{p_n(\xi)\sqrt{l^2 - \xi^2}}{x - \xi} d\xi \quad (-l < x < l).$$

is obtained and Eq. $v'(x)/_{x=\ell} = 0.$ (7)

It follows, therefore, that the walls at the ends of the crack are tangent. The author considers next two special cases: a) When interacting forces $p[2v(x)]$ are fixed and equal to σ_{th}. Then for $p = p_k$ and $2v(\pm \ell_o) = \delta_k$

$$\delta_k = -8c\ell_o\sigma_{theor} \cdot \ln \cos \frac{\pi p_k}{2\sigma_{theor}}. \quad (10)$$

For big values of ℓ_o, $p_k \to \sigma_{th}$ and Eq. (10) the known Griffiths formula is derived.

Card 4/6

On the theory of crack ...

$$p_k = \sqrt{\frac{2ET}{\pi(1-\nu^2)l_0}}\ ; \qquad (11)$$

b) In the second case, the integral equation for v(x) was obtained which cannot be solved by elementary functions. Again for large values of l_0 (or for microscopic crack) the following formula was obtained for the critical stresses

$$p_k \approx 0.95 \sqrt{\frac{2ET}{\pi(1-\nu^2)l_0}} \qquad (17)$$

which practically coincides with formula (11). There are 1 figure and 2 Soviet-bloc references.

ASSOCIATION: Instytut mashynoznavstva i avtomatyky AN URSR (Institute for the Study of Machinery and Automatics, AS UkrSSR)

PRESENTED: by Academician G.M. Savin, AS UkrSSR
SUBMITTED: November 11, 1959
Card 5/6

PANASYUK, V.V.; ONYSHKO, L.V.

On the state of stress and deformations along a linear dislocation. Dop.AN URSR no.3:318-321 '60.
(MIRA 13:7)

1. Institut mashinovedeniya i avtomatiki AN USSR. Predstavleno akademikom AN USSR G.N.Savinym [H.N.Savinym].
(Dislocations in crystals)

PANASYUK, V.V. (L'vov)

Development of an elliptic rupture. Prykl.mekh. 6 no.1:14-19 '60. (MIRA 13:6)

1. Institut mashinovedeniya i avtomatiki AN USSR.
(Strength of materials)

YANASHUK, V. V.

report presented at the 1st All-Union Congress of Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb '60.

168. A. D. Leites (Dnepropetrovsk): On space buckling of columns in the elastic-plastic range.

169. V. S. Lenskiy (Moscow): Vibro-creep at room temperature.

170. V. S. Lenskii (Moscow): Plasticity of metals under combined loading.

171. A. I. Leonov (Moscow): Some problems of non-stationary flow of an incompressible visco-elastic (Maxwellian) liquid.

172. A. I. Leonov, N. D. Businov (Moscow): Some problems of quasi-steady flow of an incompressible visco-elastic (Maxwellian) liquid.

173. M. Ia. Leonov (Lvov): The generalization of the torsion theory of thin-walled bars.

174. M. Ia. Leonov, V. V. Panasyuk (Lvov): The development of microcracks.

175. Yu. R. Lepik (Tartu): Plastic flow of circular plates under tension and bending of compression and bending.

176. S. G. Lekhnitskiy (Leningrad): Torsion of an anisotropic curved bar.

177. A. D. Lizarev (Sverdlovsk): Free vibrations and stability of ordinary and prestressed elastic restrained beams.

178. A Lisowski (Krakow): Displacement of rocks due to excavation of sloping layers.

179. B. V. Litvinov (Kiev): On the application of matrix transformations to the solution of large sets of linear equations of elasticity theory.

180. G. I. Lotkin (Tomsk): The selection of [illegible] ional parameters for structures of equal stability consisting of plates and stringers.

181. P. A. Lukash (Moscow): Large deflections of shallow shells of non-linear elastic materials.

182. Ia. D. Lvin (Voronezh): Methods for the solution of the problems of axisymmetric states of stress in shells of revolution.

183. R. A. Malakhovskii (Gomel): Analysis of an orthotropic circular conical shell under an arbitrary load applied to a ring.

184. A. V. Malashenko (Kiev): On the experimental study of strains in plates and shells.

185. V. I. Malinin (Novosibirsk): Creep strains and ruptures of high polymers.

186. B. L. Malkina (Sverdlovsk): Vibrations of non circular cylindrical shells.

187. A. K. Malmeister (Riga): Some problems of combined loading of quasi-isotropic bodies.

188. K. A. Maltsev (Leningrad): The influence of structural discontinuity in concrete on its strength.

189. A. O. Mamedova (Baku): Investigation of the state of stress in a square prism with coaxial cylindrical hole under internal pressure.

190. G. P. Mandzhavidze (Tbilisi): Solving the plane elastic problem for anisotropic bodies by reduction to the problem of linear coupling with "displacements".

191. L. I. Manevich, Yu. A. Shevliakov (Dnepropetrovsk): The stability of a cylindrical shell in bending.

192. V. M. Marchenko (Moscow): Stress and strain in naturally twisted bars.

193. V. I. Makhovikov (Tiraspol): The problems of conformal transformation and plane elasticity for the exterior of an infinite number of holes.

194. Ia. A. Macheret (Moscow): The design of finite and infinite beams on elastic foundation including time effects and without adopting the hypothesis of Zimmerman and Winkler.

195. A. S. Meliakovskii (Stalino): Vibrations of a curved bar in an elastic medium and on elastic supports.

196. S. R. Mesčian (Erevan): An experimental study of basic creep laws for soils.

197. G. S. Migirenko (Novosibirsk): On statically equivalent loadings.

198. M. Sh. Mikeladze (Tbilisi): Contribution to the theory of plastic shells of uniform strength.

199. R. S. Minasian (Erevan): On the bending of a simply supported parallelogram plate.

200. S. V. Mikhailov (Moscow): Evaluation of the rheological properties of elastic, visco-plastic materias in homogeneous strain-rate under constant shearing stress.

S/137/60/000/012/039/041
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No. 12, p. 253, # 30120

AUTHOR: Panasyuk, V.V.

TITLE: Determination of Stresses and Deformations Near a Minute Crack

PERIODICAL: Nauchn. zap. In-ta mashinoved. i avtomat. AN UkrSSR, 1960, No. 7, pp. 114 - 127

TEXT: The author determined stresses at the sharp end of a minute through crack in a solid body during the process of its development into a macroscopic crack; the development of this crack was also studied during the effect of a tensile stress perpendicular to the crack plane. Calculation formulae and numerical examples of calculation are presented.

Z. F.

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

S/735/61/000/000/013/014

AUTHOR: Panasyuk, V. V.

TITLE: Equipment for the determination of the fracture energy of brittle materials.

SOURCE: Akademiya nauk Ukrainskoy SSR. Institut mashinovedeniya i avtomatiki. Mashiny i pribory dlya ispytaniy metallov. Kiyev, 1961, 111-115.

TEXT: Equipment and methodology for the determination of the fracture energy of brittle materials are described. Test specimens are in the form of thin platelets. The principal objectives are an assessment of fissure sensitivity and a determination of the fracture energy with respect to the development of the first fissure (stress concentrator). The classical theory of the fracture of brittle materials (Griffith, A.A. The phenomenon of rupture and flow in solids. Phil. Trans. Roy. Soc. /sic1/, v. A 221, 1921) is applicable to ideal brittle bodies, e.g., glass, but in metals small plastic deformations occur within a thin layer adjacent to the fracture surface even in fractures which macroscopically appear to be perfectly brittle. Therefore, the energy expended on the propagation of a brittle fissure in a metal exceeds by far its surface energy as stipulated by classical theory. Reference is made to D.K. Felbeck's and E. Orowan's finding (The Welding Journal, v. 34, no. 11,

Card 1/3

1955) that a viscous fissure acts as pilot for brittle fracture in nonideal brittle solids. Orowan (ibid., v.34, no.3, 1955) makes Griffith's formula applicable to metals by replacing the specific-surface-energy term "T" with a term "g" which includes that energy and also the energy (work) expended on the microplastic deformation of the near-surficial layer in the propagation zone of a fissure, all referred to a unit surface. The primary objective of the new testing equipment is the determination of "g." The test platelet, of thickness h, is rectangular. A fine slit of specified length, c_o, is cut into the platelet at the center of one side, perpendicular to that side. Two rows of 4 holes each are drilled at some distance from the slit parallel to it, and the platelet is heat-treated and ground. Each row of holes is used to bolt a clamping cantilever to the plate. The ends of the two parallel cantilevers that project outside the plate are spread apart by a dynamometric screwjack device. The work thus expended is one-half the product of the measured force by the increase in distance between the two cantilever tips. At some load value, F_1, the crack will begin to propagate beyond the original length of the slit, c_o, to c_i, whereupon the force measured reduces to F_i and the distance between the cantilever tips increases from R_1 to R_i. The newly formed fracture surface is $2S_i = 2c_i h$ (4), the work expended in forming it is approximately $A_i = (F_1 - F_i) \times (R_i - R_1)$ (5). The same work may also be expressed conveniently in terms of

the deflection of the dynamometric leaf spring (working equation is provided). The specific fracture energy expended is then $g = A_1 / 2S_1$ (7). By use of leaf springs of different stiffness, the influence of the rate of release of elastic energy on the character of the propagation of a fissure in a given material can be determined with any desired degree of accuracy. Test data adduced for У8А (U8A) steel, obtained in tests with platelets having an initially slitted side of 200 mm and the other of 180 mm, quenched in oil from 820± 10°C and surface-ground, agree with the Felbeck-Orowan data. There are 3 figures, 1 (unnumbered) table, and 4 references (1 Russian-language and 3 English-language papers cited in the abstract).

ASSOCIATION: None given.

S/735/61/000/000/014/014

AUTHORS: Yermakov, A.N., Panasyuk, V.V., Teterko, A.Ya.

TITLE: A device for the detection of near-surficial defects in a nonmagnetic metal.

SOURCE: Akademiya nauk Ukrainskoy SSR. Institut mashinovedeniya i avtomatiki. Mashiny i pribory dlya ispytaniy metallov. Kiyev, 1961, 116-127.

TEXT: The device described serves to detect micrononuniformities or discontinuities, such as surficial and near-surficial fissures, cavities, nonmetallic inclusions, etc., in nonmagnetic metals. The device can also determine the intensity of the cold hardening of a nonmagnetic metal. The method is based on the measurement of the anisotropy of the electric resistance in two mutually perpendicular directions at a given point of the metal. The method is nondestructive and, hence, can be used on all production items (and not just on a few random samples); this is of value in structural parts with a small margin of safety. The device employs basically an eddy-current method (cf. Rabinovich, A.N. Avtomaticheskiy kontrol' tverdosti stali - Automatic control of the hardness of steel, Gostekhizdat UkrSSR, 1957; Mattaes, K. Aluminium, v.25, no.3, 1943, 106; Dorofeyev, A.L., Zavodskaya laboratoriya, no.7, 1959). The principal difficulty is the overwhelming

Card 1/3

effect of variations in the gap between the eddy-current sensor and the metal surface. Some other developments (incl. McGonnagle, W.I., et al., Electronics, v.32, no.35, year not given) have minimized the gap effect, but at a loss in sensitivity. The simultaneous determination of the anisotropy of electric conductivity in two mutually perpendicular directions in nonmagnetic metals and of the magnetic anisotropy in ferromagnetic metals appears to be most effective in by-passing the gap effect. The sensor of the new device is a quadrupole magnetic bridge, consisting of two mutually perpendicular crossed metal horseshoes, with a coil on each of the four legs a, b, c, and d. An a.c. circulating in the exciter coils of two opposite legs, a and c, produces in them fluxes (assumed equal and having the same sense) which close within the metal being tested. If the metal is isotropically conductive, the energy of the magnetic field will be expended on eddy currents therein, and, since the flux from each of the exciter legs to each of the other two (detector or measuring) legs will be equal, the net resultant flux in the cross legs (and, hence, the emf induced in the measuring coils wound thereon) will be zero. The exact magnitude of a plane-parallel gap between the sensor and the metal surface is of no consequence. An anisotropy of electric conductivity leads to the appearance of an emf proportional to the anisotropy in the measuring coils of the cross legs. An a.c. generator feeds the magnetic-bridge sensor with a current, the frequency f of which depends on the desired depth of penetration of the magnetic flux into the metal (the reference cited in the test is not enumerated in the numbered list of references). The emf

A device for the detection of near-surficial defects... S/735/61/000/000/014/014

emanating from the measuring coils is amplified; a voltage divider permits the use of a convenient scale. A complete circuit diagram is provided. Semiconductor triodes are employed throughout. Detailed descriptions of the generator, the power amplifier, the sensor, the voltage divider, and the circuitry for determining the active and the reactive component of the resistance are described in detail. The device is portable; outside dimensions are 250x190x150 mm; the gross weight is 4.5 kg. Detail data on the transformers and the sensor are provided. Experimental results are summarized. On a 4-mm thick Dural sheet, a circular grove was scribed, 200 mm in dia, and an artificial cavity, 2 mm dia and 1 mm deep, was located within it off center. The sensor detected each of these flaws regardless of the direction and sense of approach. A plane-parallel gap 1 mm high was simulated by an overlay sheet of "getinaks" (micarta); a subsurface location of the flaws was simulated by a 0.5-mm thick overlay sheet of Dural. Errors in the determination of the location and contour of the annular grove did not exceed ± 1%. Curves of the active and reactive components and the modulus of the total resistance of the sensor vs. the magnitude of a plane-parallel gap are plotted, as are also curves of the change in sensitivity of the device vs. gap. Thanks are expressed to O.V. Tolstosheyev and B.M. Zaydel' for help in constructing the instrument. There are 5 figures and 11 listed (12 cited) references, of which 8 are Russian-language, 2 German-language, and 1 English-language (the cited paper by McGonnagle et al.)

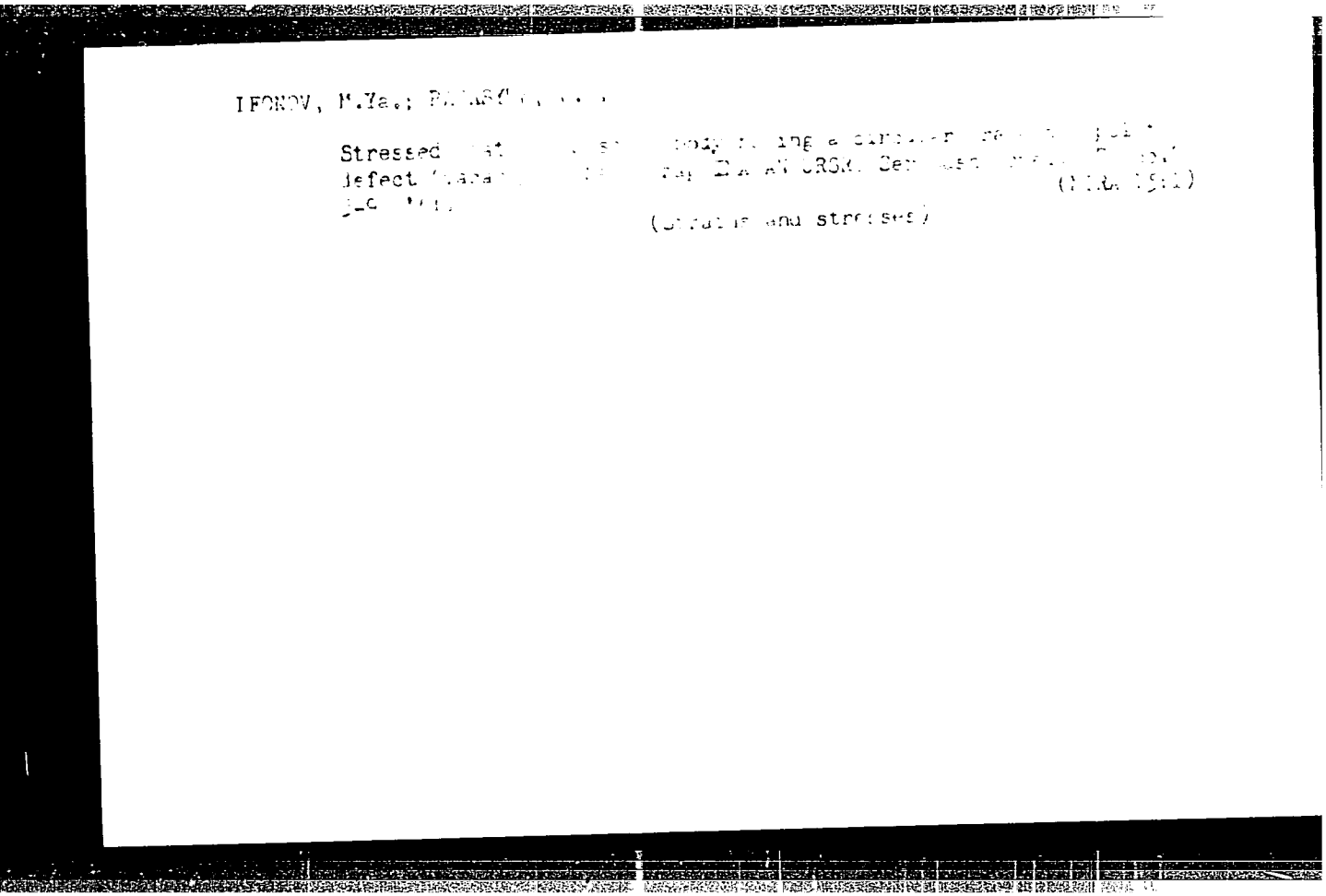
ASSOCIATION: None given.

Card 3/3

PANASYUK, V.V. (L'vov); LOZOVOY, B.L. [Lozovyi, B.L.] (L'vov)

Bending of a strip with a rectilinear slit. Prykl.mekh. 7 no.6:627-634 '61. (MIRA 14:11)

1. Institut mashinovedeniya i avtomatiki AN USSR i L'vovskiy poligraficheskiy institut.
(Beams and girders)



PANASYUK, V.V.; LOZOVOY, B.L. [Lozovyi, B.L.]

Determining the magnitude of disrupting stresses for a plate with two cracks of equal length. Dop.AN URSR no.7:876-880 '61. (MIRA 14:8)

1. Institut mashinovedeniya i avtomatiki AN USSR i Ukrainskiy poligraficheskiy institut. Predstavleno akademikom AN USSR G.N.Savinym [Savin, H.M.].
(Electric plates and shells)

KARPENKO, G.V., otv. red.; LEONOV, M.Ya., doktor fiz.-mat. nauk, zam. otv. red.; KRIPYAKEVICH, R.I., kand. tekhn. nauk, red.; MAKSIMOVICH, G.G., kand. tekhn. nauk, red.; PANASYUK, V.V., kand. fiz.-mat. nauk, red.; PODSTRIGACH, Ya.S., kand. fiz.-mat. nauk, red.; STEPURENKO, V.T., kand. tekhn. nauk, red.; TYNNYY, A.A., kand. tekhn. nauk, red.; CHAYEVSKIY, M.I., kand. tekhn. nauk, red.; YAREMA, S.Ya., kand. tekhn. nauk, red.; REMENNIK, T.K., red. izd-va; LISOVETS, A.M., tekhn. red.

[Machines and devices for testing metals] Mashiny i pribory dlia ispytanii metallov. Kiev, Izd-vo Akad.nauk USSR, 1961. 132 p. (MIRA 15:2)

1. Akademiya nauk URSR, Kiev. Instytut mashinoznavstva i avtomatyky. 2. Chlen-korrespondent Akad. nauk USSR(for Karpenko).
(Testing machines)

244200 1191 1327 1103

27332
S/021/61/000/002/006/[illegible]
D210/D303

AUTHORS: Leonov, M.Ya., and Panasyuk, V.V.

TITLE: Development of a crack having a circular form in the plan

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 2, 1961, 165 - 168

TEXT: The authors consider a body with the crack as above. At infinitely far points of the body, tensile stresses σ_∞ are applied, perpendicular to the surface of the crack. The purpose of the paper is to determine the value of σ_∞ at which the body fails. The conditions are: a) Hooke's law is valid if the stresses are smaller than σ_p, b) ultramicroscopic cracks appear if no state is possible that would satisfy the conditions of linear theory of elasticity at $\sigma \leqslant \sigma_p$, c) the surfaces of such cracks attract each

Card 1/6

Development of a crack . .

other with the stress σ_p, if the distance between them is not larger than δ_k and they do not interact at all if that distance is larger than δ_k. For an ideally brittle (amorphous) substance

$$\delta_k = \frac{2T}{\sigma_c} \qquad (1)$$

T being the surface energy of the substance; a denotes the radius of the crack before the deformation of the body, r the polar radius of the points situated in the plane of the crack, R the radius of the crack after the deformation. There are normal stresses at the surface of the crack, equal to

$$\sigma_z(r, 0) = \begin{cases} = 0 \text{ if } r \leqslant a \\ = \sigma_p \text{ if } a < r \leqslant R \end{cases} \qquad (2)$$

Substracting the homogeneous stressed state σ_∞ one obtains the auxiliary state, vanishing at infinity and characterized by p(r) =

Development of a crack ...

$$p(r) = \begin{cases} \sigma_\infty & \text{if } r \quad a \\ \sigma_\infty - \sigma_n & \text{if } a \quad r \quad R \end{cases} \qquad (3)$$

(at the surface of the crack). Using the results of M.Ya. Leonov's paper (Ref. 1: Prikladnaya matematika i mekhanika, 3, 65, 1939) and specifically formula (38), one obtains for the normal displacements w(r) of the walls of the crack

$$\frac{\pi E}{4(1-\nu^2)} w(r) = \sqrt{R^2 - r^2}\left(\sigma_\infty - \frac{\sigma_n}{R}\sqrt{R^2 - a^2}\right) + \\ + \sigma_n \int_{\arcsin\frac{a}{R}}^{\arcsin\frac{a}{r}} \sqrt{a^2 - r^2\sin^2\alpha}\, d\alpha, \qquad (4)$$

E being Young's modulus, - Poisson's coefficient. Differentiat-

Card 3/6

Development of a crack ...

ing with respect to r

$$\frac{4r}{4(1-\nu^2)}\,\frac{dw(r)}{dr}=\frac{-r}{\sqrt{R^2-r^2}}\left(\sigma_\infty-\frac{\sigma_n}{R}\sqrt{R^2-a^2}\right)-$$

$$-\sigma_n r\int_{\arcsin\frac{a}{R}}^{\arcsin\frac{a}{r}}\frac{\sin^2\alpha\,d\alpha}{\sqrt{a^2-r^2\sin^2\alpha}}. \qquad (5)$$

The tensile stresses in the body cannot be larger than the ultimate strength σ_p. It follows that

$$\left[\frac{dw(r)}{dr}\right]_{r=R+0}=0,\ \sigma_\infty R-\sigma_n\sqrt{R^2-a^2}=0.$$

Then one finds

$$R=\frac{a}{\sqrt{1-\left(\frac{\sigma_\infty}{\sigma_n}\right)^2}}. \qquad (6)$$

Card 4/6

Development of a crack ...

Formula (4) becomes

$$w(r) = \frac{4(1-\nu^2)\sigma_n}{\pi E} \int_{\arcsin\frac{a}{R}}^{\arcsin\frac{a}{r}} \sqrt{a^2 - r^2\sin^2\alpha}\, d\alpha \qquad (7)$$

The points situated on opposite surfaces of the crack, separated by distances larger than δ_k will be called the front of rupture. The existence of the latter is determined by the condition $2w(r) = \delta_k$, i.e.

$$\sqrt{1-\left(\frac{\sigma_\infty}{\sigma_n}\right)^2} = 1 - \frac{a_*}{a}, \qquad (8)$$

where

$$a_n = \frac{\pi E \delta_n}{8(1-\nu^2)\sigma_n}. \qquad (10)$$

Card 5/6

Development of a crack ...

This formula is [illegible] if [illegible] (9) can be written

$$\sigma_\infty = \sigma_n \sqrt{\frac{2a_n}{a}} \cdot \sqrt{1 - \frac{a_n}{2a}} \quad (a \geq a_n). \qquad (10)$$

The authors conclude from (10) and (6) that the strength of the body with circular crack is the same as that of a body without cracks, if the radius of the crack is not larger than a_p. If $a > a_p$ the strength is determined from (10). If $a = a_p$ one can put $\frac{a_p}{\sqrt{1 - (a_p/2a)}} \approx 1$. In this case one obtains Irwin's formula. There are 2 figures and 7 Soviet-bloc references.

ASSOCIATION: Instytut mashynoznavstva ta avtomatyky AN URSR (Institute of Machine Science and Automation, AS UkrSSR)

PRESENTED: by Academician Ukrain[illegible], N.M. Gavin

SUBMITTED: April 5, 1960

Card 6/6

S/879/62/000/000/030/088
D234/D308

AUTHORS: Panasyuk, V. V. and Losovoy, B. L. (L'vov)

TITLE: Determination of limit stresses in the extension of a plate with two unequal cracks

SOURCE: Teoriya plastin i obolochek; trudy II Vsesoyuznoy konferentsii, L'vov, 15-21 sentyabrya 1961 g. Kiev, Izd-vo AN USSR, 1962, 204-208

TEXT: The authors solve the problem of development of two unequal cracks situated on a straight line when tensile stresses are applied at infinity at straight angles to the line. The energy method (Griffith's theory) is used. The deduction is described in full in a previous paper (collection 'Voprosy mekhaniki real'nogo tverdogo tela', Izd-vo AN USSR, no. 1, 1962). There is 1 figure.

Card 1/1

44208

S/021/62/000/011/006/013
D251/D308

15 7400

AUTHORS: Panasyuk, V. V. and Lozovyy, B. L.

TITLE: On the development of two cracks of unequal length

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 11, 1962, 1444-1447

TEXT: The authors consider an infinite elastic plate with two unequal cracks lying on the x-axis in the intervals (-d, -c) and (a, b). An intensive monotonically increasing stress $\sigma_y = p$ is applied at $y = \pm\infty$. The limiting values of the external stresses for which the cracks begin to increase (develop) are sought, $p_{cr}^{(\lambda)}$ (λ = a, b, c, d) being the critical stress for development at the point p. The solution is based on certain proposals in the work of G. I. Barenblatt (PMM, v. 23, 434, 706, 893, 1959; Izv. AN SSSR. OTN, mekh. i mashinostroyeniye, 3, 79, 1960). Hence the critical stress p_{cr} is obtained from the relationship

Card 1/2

On the development ...

$$\lim_{x \to \lambda} \sqrt{x - \lambda}\, Y_y(x, 0) = \frac{K}{\pi} \qquad (4)$$

where $Y_y(x, 0)$ is the stress perpendicular to the line of the cracks and K is the modulus of cohesion. Hence applying the results of N. I. Mushkelishvili formulas for the critical stresses are evaluated in terms of elliptic integrals. The case of equal cracks and the case when the length of one is small in comparison with the length of the other are considered as special cases.

ASSOCIATIONS: Instytut mashinoznavstva ta avtomatyky AN URSR (Institute of Machine Science and Automation of the AS UkrSSR); Ukrayins'kyy polihrafichnyy instytut (Ukrainian Polygraphic Institute)

PRESENTED: by H. M. Savin, Academician

SUBMITTED: February 5, 1962

42179
S/813/62/000/001/005/006
E081/E103

AUTHOR: Panasyuk, V.V.

TITLE: Determination of the breaking load for a body weakened by an external circular crack

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut mashynoznavstva i avtomatyky, L'viv. Voprosy mekhaniki real'nogo tverdogo tela. no.1, Kiev, 1962. 63-66.

TEXT: The paper is a continuation of previous work of this author (DAN URSR, no.9, 1960). The system under consideration consists of a circular crack of radius R in the plane xOy of a body, subjected to tensile forces applied in the z direction at the points determined by coordinates (0, 0, L) and (0, 0, -L) (Fig.1). The problem is to determine the value P_{kr} of the force P at which the crack begins to propagate. Using the results quoted by G.I. Barenblatt (PMM, XXIII, v.4, 1959; and in collection "Problemy mekhaniki sploshnnykh sred" (Problems concerning mechanics of continuous media) Izd-vo AN SSSR, M. 1961) the author states the conditions for crack propagation. The stress state in the body is represented as the superposition of the stress state existing in

Card 1/3

the body in the absence of the crack, and that existing in an infinite body with a circular crack to the walls of which a specified normal stress $\sigma_z^{(1)}$ is applied. The problem of determining $\sigma_z^{(1)}$ is identified with the problem of a circular punch of radius R acting on an elastic half-space. With the aid of standard methods of solving problems of this type, the stress P_{kr} is obtained as

$$P_{kr} = -(1 - \nu) K (2R)^{3/2} H (L/R) \qquad (12)$$

where ν is Poisson's ratio and

$$H(L/R) = \frac{\left(1 + \frac{L^2}{R^2}\right)^2}{3\frac{L^2}{R^2} + 1 - 2\nu\sqrt{1 + \frac{L^2}{R^2}}} \qquad L/R$$

There is 1 figure.
SUBMITTED: June 20, 1961.
Card 2/3

42178
S/813/62/000/001/004/008
E081/E183

16 7 3

AUTHOR: Panasyuk, V.V.

TITLE: Determination of the critical load for a plate with a crack

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut mashynoznavstva i avtomatyky, L'viv. Voprosy mekhaniki real'nogo tverdogo tela. no.1. Kiev, 1962. 57-62.

TEXT: The paper is a continuation of previous work (M.Ya. Leonov, V.V. Panasyuk, DAN URSR, no.2, 1961, and V.V. Panasyuk, DAN URSR, no.9, 1960). The problem dealt with is that of a crack of length $2\ell_o$ subjected to two equal and mutually opposed concentrated forces P (Fig.1) and it is required to find the critical value of the force $P = P_k$ at which the crack begins to propagate. The solution is obtained on the basis of the ideal model of a brittle body (previous work mentioned above), according to which there is a region of weakened bonds near the end of the crack. In the frame of this concept, the problem under consideration is equivalent to the following problem of mathematical elasticity: A crack of length 2ℓ is situated in an

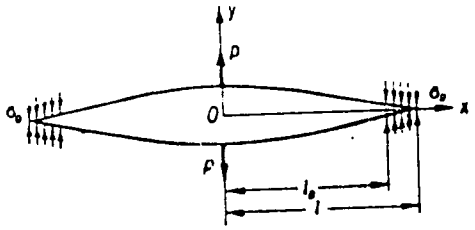
Card 1/3

Determination of the critical load ...

theory, and enabled the specific surface energy of the glass to be estimated at about 2000 erg/cm^2. There are 3 figures and 2 tables.

SUBMITTED: June 20, 1961

Fig. 1



Card 3/3

42177
S/813/62/000/001/003/006
E081/E183

AUTHORS: Panasyuk, V.V., and Lozovoy, B.L.

TITLE: Determination of the limiting stresses in extension of an elastic plane with two unequal cracks

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut mashynoznavstva i avtomatyky, L'viv. Voprosy mekhaniki real'nogo tverdogo tela. no.1, Kiev, 1962, 37-56.

TEXT: The paper is a continuation of previous work (DAN URSR, no.7, 1961) of the present authors. The system analysed is shown in the figure, and consists of two unequal cracks with their ends at the points -d, -c, a, b, with the stress applied perpendicular to the line abcd. The problem is to determine the value σ_Y^k of the tensile stress σ_y at which the equilibrium of the cracks becomes unstable, that is, the stress at which the cracks increase their length and begin to propagate. Considering the energy of the system, the critical stress will be determined by the condition

$$\frac{\partial}{\partial c}(U - W) = 0 \qquad (1)$$

Card 1/3

where γ is the decrease in the elastic energy; U is the surface energy of the crack; γ is any of the a, b, c, or d abscissae. The elastic energy γ is derived in a form containing elliptic integrals, and equations are obtained for the limiting stress at the points a, b, c, d. The simplified equations applicable to the special case of two equal cracks are also derived. The elliptic integrals required for the solution of the problem are discussed in detail and a number of theorems and relations applicable to elliptic integrals of the first, second and third kinds are proved.
There is 1 figure.

SUBMITTED: June 1, 1961

S/020/62/146/001/009/016
B108/B102

Author: Panasyuk, V. V., Savchik, S. Ye.

Title: Effect of a surface active medium on the surface energy of a brittle body

Publication: Akademiya nauk SSSR. Doklady, v. 146, no. 1, 1962, 87 - 89

TEXT: The effect of water on the development of cracks in silicate glass was studied. The surface energy of a sample plate with thickness h is $\gamma = (1 - \nu^2)P_k^2/2\pi Eh^2 l_k$, where E is Young's modulus, ν is Poisson's ratio, P_k is the critical stress at which a crack of length $2l_k$ starts to grow. Thus γ can be calculated on reading P_k from a strain gage. The authors determined the surface energy in air (γ_0) and in water (γ_w) of glass containing 71.7% SiO_2, .37% SO_3, 1.45% Al_2O_3, 0.1% Fe_2O_3, 7.6% CaO, 4.2% MgO, 14.5% Na_2O. γ_0 was between 1800 and 2700 erg/cm^2 (average 2340 erg/cm^2), γ_w was between 1400 and 2000 erg/cm^2 (average 1790 erg/cm^2). The mean ratio γ_w/γ_0 was 76%. There are 4 figures and 2 tables.

Card 1/2

S/020/62/146/001/009/[illegible]
Effect of a surface active ... B108/B102

ASSOCIATION: Institut mashinovedeniya i avtomatiki Akademii nauk [illegible] (Institute of the Science of Machines and Automation [illegible] Academy of Sciences Ukr.SSR)

PRESENTED: April [illegible], 1962 by P. A. Rebinder, Academician

SUBMITTED: April 13, 1962

Card 2/4

37682
S/198/62/008/003/002/008
D407/D301

19.7100

AUTHOR: Panasyuk, V.V. (L'viv)

TITLE: On a three-dimensional problem of elasticity theory involving an isotropic body with an elliptical crack

PERIODICAL: Prykladna mekhanika, v. 8, no. 3, 1962, 248 - 256

TEXT: An infinite isotropic body is considered, having an elliptical crack in the xy-plane. The infinite points of the body are subjected to the stresses σ_{∞}, directed along the z-axis. It is required to determine the normal stresses σ_{zz} (x, y, 0) and the vertical displacements w(x, y, 0) in the xy-plane. The boundary conditions are set up. Determination of the stresses and strains of the body under consideration reduces to solving the elasticity problem for the half-space $z \geqslant 0$. The author uses M.Ya. Leonov's results (given in the references), based on potential theory. After calculations, one obtains

$$\sigma_z(x, y, 0) = \frac{cE}{4\pi(1 - \nu^2)} \Delta_{xy} f(x, y) \qquad (1.10)$$

Card 1/4

where

$$f(x, y) = \iint_{\left(\frac{\xi^2}{a^2} + \frac{\eta^2}{b^2} < 1\right)} \frac{\sqrt{1 - \frac{\xi^2}{a^2} - \frac{\eta^2}{b^2}}}{\sqrt{(x-\xi)^2 + (y-\eta)^2}} d\xi d\eta; \quad \Delta_{xy} \equiv \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \tag{1.11}$$

A formula is derived for the function f(x, y). After further calculations, one obtains the following expression for the normal stresses

$$\sigma_{zz}(x, y, 0) = \begin{cases} 0 \text{ for } \frac{x^2}{a^2} + \frac{y^2}{b^2} < 1, \\ \sigma_\infty + \frac{b\sigma_\infty}{2\pi E(k)} \omega(x, y) \text{ for } \frac{x^2}{a^2} + \frac{y^2}{b^2} \geq 1, \end{cases} \tag{3.5}$$

where $\omega(x, y)$ is related to the operator Δ_{xy} of the function $f(x,y)$ Three particular cases are considered: 1) The stresses along the positive y-axis are determined; 2) The case $y = 0$, $x \geqslant a$; 3) The body has a circular crack and the stresses σ_∞ are perpendicular to

the plane of the crack. In all the particular cases, the formula for the stresses is greatly simplified. The obtained results are used for determining the critical stress σ_{cr}, at which the elliptical crack starts propagating in the xy-plane. For the minor axis of the elliptical crack, one obtains

$$\sigma_{cr}^{(b)} = E(k)\sqrt{\frac{2ET}{\pi(1-\nu^2)b}}. \qquad (5.4)$$

With $a = \infty$, this formula passes into Griffith's well-known formula for a plate with a rectilinear crack. For the major axis one obtains

$$\sigma_{cr}^{(a)} = \sqrt{\frac{a}{b}}\,E(k)\sqrt{\frac{2ET}{\pi(1-\nu^2)b}}. \qquad (5.5)$$

Hence $\sigma_{cr}^{b} \leqslant \sigma_{cr}^{a}$, if $b \leqslant a$. This means that an elliptical crack in a brittle body develops first in the direction of the minor axis. Such a conclusion can be also reached by Griffith's energy-method. This method was used by the author in an earlier article; the formulas thereby obtained were only approximate, whereas formulas (5.4) and

(5.5) of the present work are general. There are 2 figures and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc (including 1 translation).

ASSOCIATION: Instytut mashynoznavstva i avtomatyky AN URSR (Institute of the Science of Machines and Automation of the AS Ukr RSR)

SUBMITTED: June 1, 1961

Card 4/4

S/179/62/000/001/018/027
E081/E535

24 4200

AUTHORS: Lozovoy, B.L. and Panasyuk, V.V. (L'vov)

TITLE: Some problems of the bending of a strip with a rectilinear crack

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no.1, 1962, 138-143

TEXT: The paper deals with the deformation under stress of a beam or strip containing a linear crack at right angles to the axis of the strip; the strip is subjected to external load: a bending moment, a force acting at a point, or a uniformly distributed load. Using the complex variable method of Muskhelishvili (Ref.1: Some basic problems of the mathematical theory of elasticity, Izd-vo AN SSSR, 1954), the problem is first solved for a strip or beam without a crack in uniform bending, for a cantilever beam subjected to an end load, and for a uniformly distributed load. These solutions are modified for a strip or beam with a crack by introducing the appropriate boundary conditions. Previous results of Barenblatt (Ref.2:

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PANASYUK, V.V. (L'vov)

Some three-dimensional problems in the theory of equilibrium cracks in a deformed brittle body. PMTF no.6:85-93 N-D '62.
(MIRA 16:6)

1. Institut mashinovedeniya i avtomatiki AN UkrSSR.
(Deformations (Mechanics))

[illegible] ., [illegible] (Lvov, B.L.)

[illegible] of the problem of determining the critical force [illegible] with a noncentral crack. Dop. AN URSR no.8:1032-[illegible]

(MIRA 18:12)

1. Institut mashinovedeniya i avtomatiki AN UkrSSR i Ukrainskiy [illegible]nicheskiy institut.

L 10808-63 EWP(r)/EWT(m)/BDS AFFTC EM

ACCESSION NR: AP3000880 S/0178/63/000/002/0043/0050

AUTHOR: Lozovoy, B. L. (L'vov); Panasyuk, V. V. (L'vov) 52

TITLE: Determining the limit loading in flexure of a beam with a crack beyond its neutral axis

SOURCE: AN SSSR. Izv. Otd. tekh. nauk. Mekhanika i mashinostroyeniye, no. 2, 1963, 43-50

TOPIC TAGS: limit load, critical load, crack in a solid, crack advance, crack propagation, macroscopic crack

ABSTRACT: The stress and strain distribution around a crack in an isotropic elastic strip (beam) under flexural loading acting in its middle plane is analyzed. The rectilinear vertical crack is located in the zone of tensile stresses of the beam. The minimum transverse loading under which the crack starts to advance, called the limit (critical) loading, is determined by using the concept of a perfectly brittle solid in the solution of the problem. The state of stress and strain in a beam without a crack is described by the two N. I. Muskhelishvili analytical functions; the effect of the crack is taken into account by using appropriate boundary conditions. These functions for a beam

Card 1/2

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ACCESSION NR: AP3000880

with a crack are determined for the following types of beams and loads: 1) a beam under pure flexure, 2) a cantilever beam with a concentrated force at the free end, and 3) a simply supported beam under a continuous uniform load. The equations for determining the limit loading in all three cases are derived from expressions for the vertical displacements of the points of the crack. Macroscopic cracks are also discussed, and formulas for the limit values of moments (case 1), concentrated force (case 2), and uniform load (case 3) are given. Orig. art. has: 3 figures and 39 formulas.

ASSOCIATION: none

SUBMITTED: 10Mar62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: AP NO REF SOV: 006 OTHER: 000

Card 2/2

PANASYUK, V.V. (L'vov); KOVCHIK, S.Ye. [Kovchyk, S.IE.] (L'vov)

Determining the intensity of the energy of destruction of solid bodies. Prykl.mekh. 9 no.2:183-189 '63. (MIRA 16:3)

1. Institut mashinovedeniya i avtomatiki AN UkrSSR.
(Strength of materials)

ACCESSION NR: AT4023779 S/2722/63/000/002/0116/0127

AUTHOR: Panasyuk, V. V.; Kovchik, S. Ye.

TITLE: The effect of some surface active agents on the intensity of the energy of glass destruction

SOURCE: AN UkrRSR. Insty*tut mashy*noznavstva i avtomaty*ky*, L'viv. Vliyaniye rabochikh sred na svoystva materialov (Effect of active media on the properties of materials), no. 2, 1963, 116-127

TOPIC TAGS: glass, surfactant, surface active agent, crack, brittle failure, glass destruction, glass destruction energy, solid body destruction

ABSTRACT: The intensity of the energy required for destroying solid bodies, i. e. the work expended for the formation of a unit of a new body surface of the given material, is a very important property of the material itself. This intensity is also important for explaining the process of destruction of solid bodies and the influence of surface-active agents on this process. In this paper, a method is proposed for determining this energy, based on some results of the theory of crack propagation in brittle substances, and the method is applied to the study of silicate and organic glass in dry air and in a surface

ACCESSION NR: AT4023779

active medium. A split glass fragment was subjected to tensile forces perpendicular to the crack, and the intensity of the plate-destruction energy was considered to be equal to gamma. When this intensity was measured in the presence of different surface active materials, it was found that water significantly lowered γ (by 25%); methyl alcohol lowered it by 15%; while vaseline oil did not lower γ and even increased it in comparison with dry air. These results corroborate to some extent the hypothesis of P. A. Rebinder (Yubileyny*y sbornik, posvyashchenny*y 30-letiyu Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii, ch. I, Izd-vo AN SSSR, 1947, p. 533) that surface-active substances act in two ways on the deformation and failure of hard bodies. For some materials this effect is expressed by a lowering of gamma, while for toehrs it leads to an increase in gamma. Orig. art. has: 6 figures, 3 tables and 3 formulas.

ASSOCIATION: Insty*tut mashy*noznavstva i avtomaty*ky AN UkrRSR, Lvov (Institute of Machine Technology and Automation, AN UkrRSR)

SUBMITTED: 00	DATE ACQ: 10Apr64	ENCL: 00
SUB CODE: MT	NO REF SOV: 011	OTHER: 000

2/2

Card

PANASYUK, V.V.

Some three-dimensional problems in the theory of equilibrium of brittle solids having cracks. Vop. mekh.real'. tver.tela no. 2: 3-26 '64. (MIRA 17:9)